

Notice of Allowability**Application No.**

10/788,589

Applicant(s)

KARR ET AL.

Examiner

YAIMA CAMPOS

Art Unit

2185

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 8/23/2010.
2. ☒ The allowed claim(s) is/are 1,2,5-16,26-28 and 31-36.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 10/28/2010.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Yaima Campos/
Examiner, Art Unit 2185

DETAILED ACTION

1. As per the instant Application having Application number 10/788,589, the examiner acknowledges the applicant's submission of the amendment dated 8/23/2010. Claims 3-4, 17-25 and 29-30 have been canceled; and claims 37-38 have been added. Claims 1-2, 5-16, 26-28 and 31-38 are pending.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
3. Authorization for this examiner's amendment was given in a telephone interviews with attorney of record, Eric A. Stephenson (Reg. No. 38,321) on 10/28/2010 and 11/4/2010.
4. Claims 37-38 have been canceled and Claims 1, 15, 26 and 28 have been amended as follows:

Claim 1 (Currently Amended)

A method comprising:

in response to a request to write data to a mirrored volume, a computer system generating first and second write transactions, wherein
the first write transaction comprises a first tag, and
the second write transaction comprises a second tag;

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transmitting the first and second write transactions to first and second storage devices, respectively;

wherein the first write transaction further comprises data D to be written; wherein the second write transaction further comprises data D to be written;

storing first write information in an entry of a first tag table, wherein the first write information comprises the first tag and an identity of a logical block of a first mirror where data D is to be written, wherein the first tag table is stored in first memory;

storing second write information in an entry of a second tag table, wherein the second write information comprises the second tag and an identity of a logical block of a second mirror where data D is to be written, wherein the second tag table is stored in second memory;

synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table;

generating a first token after the first information is stored in the entry of the first tag table, wherein the first token identifies the entry of the first tag table;

generating a second token after the second information is stored in the second tag table, wherein the second token identifies the entry of the second tag table;

transmitting the first and second tokens to the computer system;

in response to a second request to write data to the mirrored volume, the computer

system generating third and fourth write transactions, wherein the third write

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transaction comprises a third tag and the first token, and the fourth write

transaction comprises a fourth tag and the second token;

transmitting the third and fourth write transactions to first and second
storage devices, respectively;

deleting the entry of the first tag table in response to the first storage device
receiving the first token;

deleting the entry of the second tag table in response to the second storage
device receiving the second token.

Claim 15 (Currently Amended)

A method comprising:

in response to a write request to write data, a computer system generating first and second write transactions;

wherein the first and second write transactions comprise first and second tags, respectively, wherein the first and second tags are identical to each other;

transmitting the first and second write transactions to first and second storage devices, respectively;

wherein the first write transaction comprises data D;

wherein the second write transaction comprises data D;

storing first write information in an entry of a first tag table, wherein the first write information comprises the first tag and an identity of a logical block of a first mirror where data D is to be written, wherein the first tag table is stored in first memory;

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storing second write information in an entry of a second tag table, wherein the second write information comprises the second tag and an identity of a logical block of a second mirror where data D is to be written, wherein the second tag table is stored in second memory;

synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table;

generating a first token after the first information is stored in the entry of the first tag table, wherein the first token identifies the entry of the first tag table;

generating a second token after the second information is stored in the second tag table, wherein the second token identifies the entry of the second tag table;

transmitting the first and second tokens to the computer system;
in response to a second request to write data to the mirrored volume, the computer

system generating third and fourth write transactions, wherein the third write transaction comprises a third tag and the first token, and the fourth write transaction comprises a fourth tag and the second token;

transmitting the third and fourth write transactions to first and second storage devices, respectively;

deleting the entry of the first tag table in response to the first storage device receiving the first token;

deleting the entry of the second tag table in response to the second storage device receiving the second token.

Claim 26 (Currently Amended)

One or more computer readable **storage** mediums storing executable instructions **executable**, wherein a method is implemented in response to executing the instructions, the method comprising:

in response to receiving a first transaction comprising a first tag and data D, storing first write information in an entry of a first tag table, wherein the first write information comprises the first tag and an identity of a logical block of a first mirror of a mirrored volume where the data D is to be written, wherein the first tag table is stored in first memory, wherein the first transaction is generated by a computer system;

in response to receiving a second write transaction comprising a second tag and data D, storing second write information in an entry of a second tag table, the second write information comprising the second tag and an identity of the logical block of a second mirror of the mirrored volume where data D is to be written, wherein the second tag table is stored in second memory, wherein the second transaction is generated by the computer system;

synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table;

generating a first token after the first information is stored in the entry of the first tag table, wherein the first token identifies the entry of the first tag table;

generating a second token after the second information is stored in the second tag table, wherein the second token identifies the entry of the second tag table;

transmitting the first and second tokens to the computer system;
in response to a second request to write data to the mirrored volume, the computer system generating third and fourth write transactions, wherein the third write transaction comprises a third tag and the first token, and the fourth write transaction comprises a fourth tag and the second token;

transmitting the third and fourth write transactions to first and second storage devices, respectively;

deleting the entry of the first tag table in response to the first storage device receiving the first token;

deleting the entry of the second tag table in response to the second storage device receiving the second token.

Claim 28 (Currently Amended)

A method comprising:

a request to write data to a mirrored volume, a storage manager generating first and second write transactions;

generating first and second tags;

transmitting the first write transaction to a first storage device;

transmitting the second write transaction to a second storage device;

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transmitting the first tag to the first storage device;
transmitting the second tag to the second storage device;
wherein the first write transaction comprises data D to be written;
wherein the second write transaction comprises data D to be written;
receiving the first write transaction at the first storage device;
receiving the first tag at the first storage device;
storing the first write information in an entry of a first tag table, wherein the write information comprises the first tag and an identity of a logical block of a first mirror where data D is to be written, wherein the first tag table is stored in first memory;
receiving the second write transaction at the second storage device;
receiving the second tag at the second storage device;
storing the second write information in an entry of a second tag table, wherein the write information comprises the second tag and an identity of a logical block of a second mirror where data D is to be written, wherein the second tag table is stored in second memory;
synchronizing the first and second mirrors after storing the first write information in the entry of the first tag table and after storing the second write information in the entry of the second tag table;

generating a first token after the first information is stored in the entry of the first tag table, wherein the first token identifies the entry of the first tag table;

generating a second token after the second information is stored in the second tag table, wherein the second token identifies the entry of the second tag table;

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transmitting the first and second tokens to the computer system;
in response to a second request to write data to the mirrored volume, the
computer
system generating third and fourth write transactions, wherein the third write
transaction comprises a third tag and the first token, and the fourth write
transaction comprises a fourth tag and the second token;
transmitting the third and fourth write transactions to first and second
storage devices, respectively;
deleting the entry of the first tag table in response to the first storage device
receiving the first token;
deleting the entry of the second tag table in response to the second storage
device receiving the second token.

Claim 37 (Canceled)

Claim 38 (Canceled)

RELEVANT ART CITED BY THE EXAMINER

5. The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.
6. The following references teach an apparatus and method for performing an instant copy data, comprising an original data map and a copy data map.

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US 5,592,618

7. The following reference teaches remote copy from a primary system to a secondary system and validation of copied data using check codes.

US 6,804,755

REASONS FOR ALLOWANCE

8. The following is an examiner's statement of reasons for allowance:
9. Per the instant office action, claims 1-2, 5-16, 26-28 and 31-36 are considered as allowable subject matter.

The reasons for allowance of claims 1, 15, 26 and 28 are that the prior art of record, including the references cited above, neither anticipates, nor renders obvious the recited combinations as a whole.

Regarding claims 1, 15, 26 and 28, the prior art of record, neither anticipates, nor renders obvious the recited combinations of "generating a first token after the first information is stored in the entry of the first tag table, wherein the first token identifies the entry of the first tag table; generating a second token after the second information is stored in the second tag table, wherein the second token identifies the entry of the second tag table; transmitting the first and second tokens to the computer system; in response to a second request to write data to the mirrored volume, the computer system generating third and fourth write transactions, wherein the third write transaction comprises a third tag and the first token, and the fourth write transaction comprises a fourth tag and the second token; transmitting the third and fourth write transactions to first and second storage devices, respectively; deleting the entry of the first tag table in response to the

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first storage device receiving the first token; deleting the entry of the second tag table in response to the second storage device receiving the second token.”, in combination with all the other limitations in independent claims 1, 15, 26 and 28.

Dependent **claims 2, 5-14, 16, 27, 31-36** are allowable at least for the reasons recited above as including all of the limitations of the allowable independent base claims upon which they depend.

10. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

DIRECTION OF FUTURE CORRESPONDENCES

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yaima Campos whose telephone number is (571)272-1232 and email address is yaima.campos@uspto.gov. The examiner can normally be reached on Monday to Friday 8:30 AM to 5:00 PM.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

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more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

November 4, 2010

/Yaima Campos/
Examiner, Art Unit 2185